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GAS ABSTRACTS

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1. GAS INDUSTRY

Canadian Gas

Howe, C. D. PETROLEUM AND NATURAL GAS. *Canadian Gas J.*, 46, 89-93 (1953) April.

The author, Canada's Minister of Trade and Commerce, outlines dominion laws under which exportation of natural gas is regulated, and opposes moving natural gas by pipe line across an international boundary "until such time as we are convinced there can be no economic use, present or future, for that natural gas within Canada." He proposes that the Canadian gas industry build a trans-Canada pipe line from the western producing fields to Toronto, Montreal and intervening cities. A. E. Neumann

Gas Reserves

GAS RESERVES, PRODUCTION UP. *Am. Gas Assoc. Monthly*, 35, 3-5 (1953) April.

Proved recoverable reserves of 199.7 trillion cu.ft. as of the end of 1952 is a record high. Production in 1952 was a record 8.6 trillion cu.ft. Tables of estimated recoverable reserves for natural gas and gas liquids are included.

B. E. Eakin

PROVED RECOVERABLE RESERVES OF NATURAL GAS REACH NEW HIGH OF 200 TRILLION CU. FT. *Gas Age*, 3, 49-51 (1953) April 9.

In a joint report of the Committee on Reserves of the American Gas Association and the American Petroleum Institute it was announced that proved recoverable reserves of natural gas, as of December 31, 1952, have increased 5.9 trillion cu.ft. over reserves of last year, after a record high production of 8.6 trillion cu.ft. Reserves of natural gas liquids rose from 4.72 to almost 5.0 billion barrels. Crude oil reserves rose from 27.47 billion lbl. to 28.0.

D. M. Mason

Industry Growth

TEXAS GAS IS STILL GROWING. *World Oil*, 136, 252 (1953) April.

Texas Gas Transmission Company formed by the merging of Memphis Natural and Kentucky Natural in 1948 continues its expansion. Completion of current construction will give a daily pipeline capacity of 1.06 billion cu.ft.

W. G. Bair

LP-Gas Petrochemicals

Carney, B. R. and Meyer, R. E. PETROCHEMICAL INDUSTRY LOOKS TO LIQUEFIED PETROLEUM GAS. *Petroleum Refiner*, 32, 123-127 (1953) April.

During the last ten years the petrochemical industry has consumed most of its cheaper sources of raw material and now is looking more and more to ethane, ethylene, propane, propylene, butane and butylenes as another source. Demand for major products, such as ethyl alcohol, ethylene glycol, polyethylene, glycerin and synthetic rubber, indicates that costs of these raw materials will increase as the petroleum industry takes over the duty of supplying the chemical manufacturer.

R. A. Bambenek

The following articles, the abstracts for which appear on the pages indicated, are also called to your attention:

Lahee, F. H. WILDCAT DRILLING SCORE. p. 103

McIntosh, A. J. FUEL OIL DEMAND, TO '55. p. 106

2. APPLIANCES

Burners

Heller, M. A. and Conti, A. J. GAS BURNER WITH FORCED COMBUSTION AIR. U. S. 2,632,502 (1953) March 24.

A burner of the forced draft type for converting from oil to gas fuel is described.

E. F. Searight

Kerwin, D. G. and O'Callaghan, F. C. (assigned to The Rails Co.) GAS FUELED RAIL HEATER. U. S. 2,633,190 (1953) March 31.

Young, C. C. HORIZONTALLY FIRED GAS-OIL BURNER. U. S. 2,636,554 (1953) April 28.

Combustion Controls

Schlenz, H. E. (assigned to Pacific Flush Tank Co.) FURNACE AND CONTROL SYSTEM FOR GASEOUS AND LIQUID FUEL BURNERS. U. S. 2,635,813 (1953) April 21.

Mollenauer, W. E. THERMAL CONTROL MEANS FOR HOUSE HEATING SYSTEMS. U. S. 2,635,814 (1953) April 21.

Hill, H. G. (assigned to Chatco Steel Products Ltd., Tilburg, Ontario) THERMOSTATIC SAFETY BY-PASS DAMPER. U. S. 2,636,-683 (1953) April 28.

Huck, A. J. (assigned to Knapp-Monarch Co.) TEMPERATURE CONTROL UNIT. U. S. 2,636,959 (1953) April 28.

Mayer, C. M., Perl, R. L., Hoff, J. M., Warner, E. L. (assigned to The Tappan Stove Co.) AUTOMATIC IGNITION AND CONTROL MECHANISM FOR OVEN BURNERS. U. S. 2,637,385; 2, 637,386; 2,637,387; 2,637,388; 2,637,389; 2,637,390; 2,637,391; 2,637,392; 2,637,393 (1953) May 5.

Drier

Geldhof, P. E. and Morrison, H. E. (assigned to Whirlpool Co.) GAS-HEATED DRIER. U. S. 2,635,354 (1953) April 21.

Heat Pump

O'Neill, P. F. HEAT PUMP — NEW LOAD ON UTILITY HORIZON. *General Electric Rev.*, 56, 47-50 (1953) March.

The effect of the heat pump in utilities is stressed, and a method for estimating the heating season load requirements of a heat pump for a residence is given. A. R. Khan

Oven Venting

Williams, W. E. (assigned to Chambers Corp.) GAS OVEN VENTILATION. U.S. 2,634,-718 (1953) April 14.

The patent provides for the removal of the products of combustion and cooking odors in gas ranges with the further objective of utilizing the heat. A fan draws the heated gases from the oven through a duct into a compartment where they are filtered and exhausted through a flue, or passed into the room.

A. J. Tulis

Water Heater

Montgomery, C. W. WATER HEATER. U. S. 2,636,482 (1953) April 28.

3. COMBUSTION AND INDUSTRIAL FURNACES

Atomic Fuel Competition

Stanbury, W. A., Jr. POWER FROM THE ATOM. *Coal Age*, 58, 70-75 (1953) April.

Electric power generation from atomic fission is discussed from the standpoint of costs and possible replacement of currently used fuels. Although fuel costs for nuclear power plants would be small, the facilities required would be costly. The costs could be competitive if the plants were subsidized by the sale of fission products to the government for atomic weapon purposes. All the technological problems are not completely solved. These include problems of heat-transfer materials, construction materials and waste disposal. At present four teams of public utility power companies are conducting extensive research in nuclear power. There is agreement that atomic fission will be used for power generation in the near future. However, atomic power will merely supplement but not replace present power generating facilities. E. J. Pyrcioch

Blast Furnace Practise

Rueckel, W. C. KAISER STEEL PRODUCTION RECORD SET BY COKE AND BLAST FURNACE PRACTICE. *J. Metals*, 5, 509-14, (1953) April.

Steps in the evolution of the blast furnace practice at Fontana are outlined, where despite weakly coking Utah coal and quite variable Western ores an excellent production record has been attained. Properly controlled blending of char, pitch and Oklahoma coals with the Utah coal, and also coking in narrow ovens at

high (2100°F.) temperatures has yielded greatly improved coke. Ore selection, crushing, sizing, sintering and bed-blending has improved the uniformity of burden and smoothness of operation. An average of 1335 tons iron/day on the 2 furnaces was attained in 1952, using 1409 lb. coke. O. P. Brysch

Control Panels

Nichols, R. L. THE CASE OF THE GRAPHIC PANEL. *Southern Power & Industry*, **71**, 76-79 (1953) April.

A general discussion of graphic control panels and their usefulness. Many applications of graphic panels are not necessary. W. G. Bair

Flue-Gas Treatment

Rees, R. L. THE REMOVAL OF OXIDES OF SULPHUR FROM FLUE GASES. *J. Inst. Fuel* (British), **25**, 350-7 (1953) March.

The development of flue-gas washing in Great Britain is described. This development came about as a result of public pressure which it is claimed, did not distinguish sufficiently between discharges from short and tall chimneys. It is claimed that ordinary flue gas, discharged hot and at reasonably high speed from well designed chimneys, is not harmful to health or to agriculture, and that the cooling of the gas associated with washing decreases the efficiency of the chimney so that washing may actually increase the local pollution in certain states of weather. Processes for recovery of sulfur compounds are also discussed. D. M. Mason

BATTLE REPORT ON POLLUTION CONTROL. *Power*, **97**, 74-6, 196, 8 (1953) April.

A review of modern practices to reduce fly ash and dust to give cleaner stack gas. Particular attention is devoted to electrical precipitators. The theory is reviewed and correlating data is presented to give collector efficiencies of 98 to 99%. G. V. Vosseller

Gas Plating

Belitz, H. G., Davis, O. F. METHOD AND APPARATUS FOR GAS PLATING. U. S. 2,631,948 (1953) March 17.

A method and apparatus for gas plating of metal surfaces with metal carbonyls. The process is continuous and thus overcomes limitations and disadvantages of closed chamber processes. The object to be plated is conveyed past a hood that contains a heat source, metal carbonyl vapor nozzle and inert gas source. The surface being heated to approximately 400°F. is then plated over the area under the hood in absence of air. A rate of 50 sq. in/min is claimed with nickel as the plating metal.

R. A. Bambenek

SO_2 Production

HI-PURITY LIQUID SO_2 FROM ROASTER GASES. *Chem. Eng.*, **60**, 274-7 (1953) April.

A flow sheet and brief description of a process for recovery of SO_2 from waste gases is presented. Liquid SO_2 of 99.9975 purity is now produced on a commercial scale by this process using dimethylaniline as absorption medium.

D. M. Mason

4. CARBONIZATION AND GASIFICATION

Ammonium Sulfate

Robinson, S. P. (assigned to Phillips Petroleum Co.) AMMONIUM SULFATE PRODUCTION. U. S. 2,631,084 (1953) March 10.

Production of an improved granular ammonium sulfate is claimed, in which the ammonium sulfate solution is concentrated by a submerged-flame evaporator to form a magma of small crystals, which is then thickened to 30-80% solids content. Thickened magma is fed to a mixer, where dry fines, dust or crushed sulphate are agglomerated with it, to form granules of fine crystals cemented by the supersaturated solution. After passing through a rotary drier the granules are screened to desired size, with recycling of larger and smaller sizes.

O. P. Brysch

Ash Problems

PROBLEMS THAT ASH PRESENTS TO GAS ENGINEERS. *Gas Times* (British), **75**, 43-44 (1953) April 3.

The problems that ash presents in the operation of gas plants and its influences on the final cost of the gas are summarized. Increased coal

costs, decreased life of refractories and increased boiler fuel consumption are the main difficulties for which high ash coal is responsible. E. J. Pyrcioch

Carbonization Industries

Greenwood, H. D. PRODUCTION OF GAS AND CARBONIZED FUELS — TODAY AND TOMORROW. *J. Inst. Fuel* (British), **25**, 379-383 (1953) March; *Gas World* (British), **137**, Cokg. Sec., 56-61 (1953) April 4.

The different objectives and techniques of the gas and coking industries are compared. The output of the gas industry has been expanding at the rate of about 3 per cent per annum; estimates are also given for the future requirements of furnace coke. The combined coal requirements of the two industries may be over 62 million tons per annum by 1960. The high-class carbonization coals are becoming worked out, and it will be necessary to use increased proportions of lower-grade coals, and to blend these with the limited output of the best coking coals. Larger proportions of coal from the Yorkshire and Midlands area may have to be used. The possible advantages of centralized carbonization plants, and of complete gasification, are considered. Various new methods of carbonization and gasification are examined, and the possibility of applying them to the production of a reactive smokeless fuel at a competitive price is discussed. Author's Abstract

Coal Minerals Research

Nelson, J. B. ASSESSMENT OF THE MINERAL SPECIES ASSOCIATED WITH COAL. *Brit. Coal Utilization Research Monthly Bull.*, **17**, 41-55 (1953) February. (BCURA Review No. 123)

The practical importance of the nature and distribution of inorganic matter in coal is outlined. The problems involved in their complete determination are cited from a bibliography of about 75 articles. The six principal mineral groups are termed: M (muscovite-montmorillonite) K (kaolin), S (sulfide), C (carbonate), H (halogen) and A (accessory, associated with M). Separation by sink-and-float and by removal of coal substance, and the possible methods of detection and estimation of the mineral species are mentioned in some detail. Development of a logical analytical procedure, using known techniques, remains a research problem. O. P. Brysch

Coke Evaluation

Mulcahy, B. P. THE COKE EVALUATION PROGRAM IN OPERATION. *Blast Furnace and Steel Plant*, **41**, 408-12 (1953) April.

The Coke Evaluation Program of the American Iron and Steel Institute and the American Coke and Coal Chemicals Institute is considered as three individual stages: (1) field work on tests, (2) statistical analysis of field data and (3) continued application for 1 year of the 7 selected tests to determine correlation of coke indices and furnace results. The first two steps have permitted a comprehensive analysis of the meaning and value of all the tests for the first time, and have resulted in simplification, time and cost reduction, and an easier study of the testing program and its results. The third step still is needed to establish confidence in the various test relationships on cokes and to correlate these with selected, accurate operating data on the furnaces. The seven selected coke test methods — sampling, moisture, volatile matter, ash, sulfur, screen tests, bulk density, tumbler, are briefly reviewed and their significance is discussed. O. P. Brysch

Flash Pulverization

Singh, A. D. (assigned to Institute of Gas Technology, Chicago.) METHOD FOR TREATING COAL AND THE LIKE. U. S. 2,636,688 (1953) April 28.

In a method of preparing finely comminuted coal which consists of discharging the flowing suspension of granular coal in air (in weight ratio 6:1) continuously from a region of high air pressure to a region of at least 15 psi lower pressure (see Yellott, U.S. 2,515,541) in a cylindrical space, an improvement is claimed which comprises adding preheated air to the vortex at the prevailing pressure to cause combustion, softening and devolatilization of the particle with further shattering. O. P. Brysch

CO_2 Production

CARBON DIOXIDE FROM FUEL OIL. *Chem. Process Eng.*, 34, 83, 84 (1953) March.

A description of the production of liquid carbon dioxide by the Kestnamine process in small plants having an output of 100 or 200 lb./hr. by combustion of fuel oil. B. E. Eakin

Fluidized Gasification

Gornowski, E. J. and Nelson, K. J. (assigned to Standard Oil Development Co.) GASIFICATION OF CARBONACEOUS SOLIDS. U. S. 2,633,416 (1953) March 31.

A method of gasification of carbonaceous solids using a fluidized bed is claimed, whereby the heat from the combustion reaction is utilized to the maximum. S. Mori

Gornowski, E. J. and Nelson, K. J. (assigned to Standard Oil Development Co.) GASIFICATION OF CARBONACEOUS SOLIDS. U. S. 2,633,417 (1953) March 31.

A process of producing synthesis gas is claimed, where the sensible heat from the product gas is utilized to preheat the solid carbonaceous particles before these undergo reaction. S. Mori

Kalbach, J. C. (assigned to Hydrocarbon Research, Inc.) COAL CARBONIZATION AND GASIFICATION. U. S. 2,634,198 (1953) April 7.

A new reactor for gasification of powdered coal consists of two vessels combined in one shell. Powdered coal is blown into an inner cyclone vessel when the coal is devolatilized. Coal gas and tar are taken overhead and coke fines are discharged from the bottom of the cyclone into the outer vessel where they are fluidized with O_2, H_2, steam or suitable mixture of these. This step of the process is heat releasing and supplies heat to the coking process. This step also produces a water gas, carbureted water gas or synthesis gas depending on the gas mixture used for fluidizing. W. G. Bair

Lewis, W. K. (assigned to Standard Oil Development Co.) METHOD OF MANUFACTURING A GAS RICH IN CARBON MONOXIDE. U. S. 2,631,934 (1953) March 17.

A process is claimed for making a carbon monoxide-rich gas from solid carbonaceous fuels by the use of two dense-fluidized zones, the first fed with heated steam, oxygen and CO_2 from the second zone, to yield a reducing gas; and the second receiving fuel from the first, and subjecting it to combustion. O. P. Brysch

Hydrocarbon Gasification

Dirksen, H. A., Linden, H. R. and Pettyjohn, E. S. CRACKING CATALYST ACTIVITY IN THE PRESENCE OF HYDROGEN SULFIDE. Institute of Gas Technology (Chicago) Research Bulletin 4, (1953) February.

Catalytic cracking of propane and other hydrocarbons of low molecular weight, especially natural gas, has achieved industrial importance as a method for producing utility gases. Emergency conditions, economic factors or depletion of hydrocarbon sources may necessitate charging sulfur-contaminated stocks, materials not now useable because of loss of catalyst activity due to sulfur poisoning.

The search for a highly active, sulfur-resistant catalyst for cracking propane was conducted among the many known catalysts for related reactions. Nickel, iron and cobalt of Group VIII, chromium, molybdenum and tungsten of Subgroup VIa, and vanadium, columbium and tantalum of Subgroup Va, with thoria and zirconia of Subgroup IVa as promoters, were prepared in sulfide and oxide forms on various supports in a "standard" 1:3 mole ratio of catalytic substance to support, and in other ratios, and subjected to a "standard" test procedure to measure their activities without and with the addition of sulfur in the form of H_2S.

Nickel in its various forms was found to be the most promising catalyst for the steam-propane reaction, followed by molybdenum. Iron, chromium and cobalt were generally less active. The sulfide forms of these catalysts were normally more active in the presence of H_2S than the corresponding oxide forms.

A study of the effect of molar concentration of catalytic material to support material indicated that an optimum catalyst-to-support ratio existed.

Further studies showed that mixed catalysts tended to show no improvement in activity over that of the higher activity component, but had somewhat greater sulfur-resistance.

Authors' Abstract

Oxide Purifiers

Roberts, G. F. THE HANDLING AND PREPARING OF PURIFIER MATERIALS. *Gas World* (British) 87, 856 (1953) March 28.

Small hydraulic loaders are being used successfully to haul spent oxide to elevators, one machine doing the work which formerly required six men. Problems in obtaining a homogeneous mixture of the components of a purifier charge are discussed. C. E. Hummel

Rank of Coal

Patteisky, K. DIE VERAENDERUNGEN DER STEINKOHLEN BEIM ABLAUF DER INKOHLUNG. (THE ALTERATION OF BITUMINOUS COALS DURING THE COURSE OF COALIFICATION). *Brennstoff-Chemie*, (German) 34, 75-82 (1953) March 18; 102-108, April 15.

After a review of the properties and occurrence of the banded constituents of the higher-carbon coals, a detailed discussion of the vitrit is presented. The relationship of its amount and appearance in various ranks of German coals to the types of the original plants is outlined and well illustrated. Applications to the classification of coals in accordance with their degree of coalification, and directions for testing are given. References to 52 items are cited. O. P. Brysch

Tar Properties

Kinney, C. R. and Dell, M. B. ACTION OF LIGHT ON TAR FRACTIONS. *Ind. Eng. Chem.*, 45, 809-814 (1953) April.

The origins of the various tars and a thorough discussion of the procedures and apparatus used in measuring the amount of insoluble matter deposited from solution are presented. The effects on precipitation of the solvents employed, time of exposure, concentration of tar oils, wave length of light employed, oxygen, fractionation, and other reagents are discussed. R. Parker

Water Gas Catalyst

Moak, O. W. and Spicer, W. E. (assigned to Standard Oil Development Co.) WATER-GAS SHIFT CATALYST PREPARATION AND WATER-GAS SHIFT PROCESS. U. S. 2,631,086 (1953) March 10.

A water-gas shift reaction catalyst with a higher activity than the conventional one is claimed in this patent which uses a process wherein the chromic oxide is mixed directly with the ferric oxide. S. Mori

5. NATURAL GAS AND NATURAL GAS CONDENSATES

Carbon Black

Krejci, J. C. (assigned to Phillips Petroleum Co.) CARBON BLACK PROCESS. U. S. 2,632,713 (1953) March 24.

The production by the helical flame process of a furnace-type carbon black is described, which possesses a relatively low pH value without adversely affecting other properties of the black. The fuel is mixed with a combustible compound of silicon, boron or germanium, and is introduced tangentially with air into a cylindrical furnace. I. P. Patel

Dehydration

Campbell, J. M. and Laurence, L. L. DEHYDRATION OF NATURAL GAS AND LIGHT HYDROCARBON LIQUIDS. PART VI. THE USE OF ADSORPTION AND DISTILLATION TO DRY LIQUIDS. *Petroleum Ref.*, 32, 151-158 (1953) March.

The sixth and last of the series on dehydration deals with the design and the economics of the dry desiccant and distillation drying plants for liquids. Dry desiccant plants dehydrate the bulk of the liquid in product pipe lines due to their flexibility and the ease with which products of varying composition may be handled without undue control problems. Distillation-type plants offer the advantage of both lower initial and operating cost. I. P. Patel

Demand Estimates

Miller, R. T. ESTIMATING MAXIMUM DAY AND HOUR DEMAND TO DESIGN AND

OPERATE DISTRIBUTION. *Gas Age*, **111**, 26-30 (1953) March 26.

Portland Gas & Coke Company's experience correlating sendout to the daily mean temperature is discussed. R. F. Bukacek

Person, K. W. WHY MINNEAPOLIS INSTALLED 30 MILES OF 24-INCH BELT LINE. *Gas Age*, **3**, 33-35, 86 (1953) April 9.

A description of Minneapolis Gas Company's new belt line, designed to accommodate their high saturation of house heating.
R. F. Bukacek

Sneddon, R. MID-WINTER PEAK PROBLEM. *Petroleum Eng.*, **25**, D-14, 6, 8 (1953) April.

A description of Southern California Gas Company's current expansion program which is designed to take care of the winter peak.
R. F. Bukacek

1952 Drilling

Lahee, F. H. WILDCAT SCORE: 12,424 HOLES — 2,334 WELLS. *Oil Gas J.*, **51**, 138, 140-3 (1953) March 30.

1952's wildcat drilling score is broken down according to states; oil, gas, or condensate; producers, and dry holes; and methods of locating the wells. Wells drilled on technical advice averaged 3.8 times as successful as those drilled without such advice. B. E. Eakin

Hydrocarbon Recovery

Miller, A. J. (assigned to Phillips Petroleum Co.) METHOD OF SEPARATING AND RECOVERING HYDROCARBONS. U. S. 2,630,402; 2,630,403 (1953) March 3.

The process comprises absorbing the hydrocarbons to be recovered in a liquid absorption medium such as an oil, and subsequently separating such absorbed hydrocarbons from the absorption medium in steps which may include flashing, venting, stripping and fractional distillation. It also utilizes selective adsorption to separate and recover light hydrocarbons such as ethane and methane. This process has many advantages over the usual system utilizing an absorber in conjunction with a reabsorber.
I. P. Patel

LP-Gas Storage

Abell, C. HOW TO MAKE YARD INSTALLATIONS SAFE. *Butane-Propane News*, **15**, 65-74 (1953) April.

A thorough discussion of safety in LP-gas tank installations at individual retail customer sites is based on recommendations in NFPA pamphlet No. 58. Several illustrations of correct piping, regulator and tank locations are included.
W. G. Bair

Main Cleaning

Wilkinson, D. G. INTERNAL CLEANING OF GAS MAINS. *Gas World* (British), **87**, 849-850 (1953) March 28.

A procedure for mechanically cleaning the corrosion scale from the inside of town gas distribution mains is outlined. Labor requirements and cost data are given for an actual cleaning operation in Southport, England. J. M. Reid

Production

Clason, C. E. and Hower, W. F. REMOVAL OF FLOW RESTRICTIONS IN WELL COMPLETIONS. *Cal. Oil World*, **46**, 1, 3, 4, 6, 8 (1953) March 31.

Wells completed using water-base mud tend to reduce the permeability of the producing formation by plugging of sands with the mud material. A new method of acidizing using a mixed acid which will break water-oil emulsions and reduce the attraction of bentonite for water has proved to be very effective in increasing oil production. New uses are continuing to be found for the acid mixture. B. E. Eakin

Ritter, C. L. PROBLEMS IN PRODUCING AND GATHERING LOW PRESSURE GAS. *Petroleum Eng.*, **25**, B-78-92 (1953) March.

Modern practices in the gathering of low-pressure gas, and the necessity of close cooperation between plant and production personnel are discussed. B. E. Eakin

Shallenberger, L. K. WHAT ABOUT COMPRESSED AIR? *World Oil*, **136**, 155, 56, 59, 60 (1953) April.

Drilling with compressed air as the circulating medium has proved effective in hard rock

country by increasing penetration rate and bit life. Compressed air has been used for completions in fractured formation where conventional mud tends to plug the fissures. The replacement of mud by air has eliminated freezing problems during winter operations, and tends to eliminate lost circulation problems. B. E. Eakin

NEW NITROGEN IMPACT JAR ELIMINATES JARRING ACTION. *World Oil*, **136**, 124-6, 132 (1953) March.

The nitrogen impact jar can be used to loosen liners and packers without the use of heavy equipment, considerably reducing workover costs. By using delayed release of a compressed-air packed free hammer within the jar, the entire jarring action is concentrated on the fish. The blow is delivered while the fish is in tension, resulting in no undue strain on the rig or pipe. B. E. Eakin

Sulfur from H_2S

Gamson, B. W. and Elkins, R. H. SULFUR FROM HYDROGEN SULFIDE. *Chem. Eng. Progress*, **49**, 203-215 (1953) April.

The literature on the conversion of hydrogen sulfide to elemental sulfur is reviewed. The thermodynamics of the formation of sulfur from hydrogen sulfide is developed. A rigorous and unique calculation procedure is outlined. Limitations of literature-suggested calculation techniques are described. Restrictions on the design of units for this conversion are reviewed and the adaptations of the Claus process studied. Original kinetic and yield data on the oxidation of both hydrogen sulfide and carbonyl sulfide are presented. Authors' Abstract

Sulfurized Carbon Black

Leatherman, G. T. (assigned to Phillips Petroleum Co.) PROCESS OF PREPARING CARBON BLACK CONTAINING SUBSTANTIAL AMOUNTS OF SULFUR. U. S. 2,631,107 (1953) March 10.

By heating a carbon-containing organic compound with sulfur dioxide in the presence of hydrogen fluoride as a catalyst, carbon black containing substantial amount of sulfur could be prepared. D. C. Gami

Trench Techniques

Babbe, G. M. TECHNIQUES AND EQUIPMENT FOR SOIL COMPACTION. *Gas*, **29**, 54-57 (1953) April.

The different means of compacting backfill in pipe laying work are discussed together with possible future developments. R. F. Bukacek

Gally, S. NEEDED: QUICK, ACCURATE SOIL DENSITY TEST METHODS. *Gas*, **29**, 52, 53 (1953) April.

A description of the different methods for determining soil density, a factor of interest where cities or states specify backfill requirements. R. F. Bukacek

Underground Storage

Reutzel, R. C. PIPING PROBLEMS OF OAKFORD STORAGE PLANT. *Pipe Line News*, 25, 25-29 (1953) March.

Piping at Oakford storage plant is designed for a working pressure of 1500 psi at 100°C. with delivery capacity of 400 million cu.ft. a day. D. C. Gami

Well Pressures

Cornell, D. and Katz, D. L. PRESSURE GRADIENTS IN NATURAL GAS RESERVOIRS. *J. Petroleum Techn.*, 5, 61-70 (1953) March.

Procedures for computing turbulent flow of gas in steady state near the well bore and a graphical method for predicting unsteady state laminar flow at distances from the well have been combined to compute pressure gradients in gas reservoirs. Methods are discussed for predicting single and multiple transients at constant flow rate in an infinite reservoir, predicting constant flow rates in a finite reservoir, reproducing and interpreting back pressure test data, and prediction of the behavior of a closed-in gas well. An example of the graphical method is given for a single transient and the results are compared to a published analytical solution. A typical calculation of the pressure gradient in a reservoir and the production of gas is made starting with data from a back pressure test. Authors' Abstract

Thomas, G. B. ANALYSIS OF PRESSURE BUILD-UP DATA. *J. Petroleum Techn.*, 5, 125-128 (1953) April.

Several methods of analyzing pressure build-up data in wells have been presented by various authors. This paper reviews the theory and method of D. R. Horner and presents example calculations performed on data obtained by testing several different types of wells. These calculations include: (1) graphical estimation of final static pressure, (2) determination of the productive capacity of the pay away from the well bore and, (3) the degree to which the formation adjacent to the well bore has been damaged by complication or other causes. The methods of testing and precautions which should be taken to assure the best data possible are discussed. Limitations and reliability of calculated results are also treated.

Author's Abstract

The following articles, the abstracts for which appear on the pages indicated, are also called to your attention:

Dirksen, H. A. CRACKING CATALYST ACTIVITY IN PRESENCE OF H_2S. p. 101

Kay, W. B. EQUILIBRIUM IN ETHANE-HYDROGEN SULFIDE SYSTEM. p. 110

Sachsse, H. ACETYLENE BY COMBUSTION OF HYDROCARBONS. p. 111

6. PETROLEUM AND SYNTHETIC LIQUID FUELS

Cracking Catalyst

Smith, R. L. (assigned to Socony-Vacuum Oil Co.) PROCESS FOR ACTIVATING CHROMIA-ALUMINA CATALYST. U. S. 2,635,-082 (1953) April 14.

A method for activating chromia-alumina hydrogel during the preparation, to yield a co-gelled catalyst of improved activity and decreased coke formation, is patented.

H. A. Dirksen

Desulfurization

Arnold, R. C. and Deters, J. F. (assigned to Standard Oil Co.) DESULFURIZATION OF OLEFINIC NAPHTHA. U. S. 2,634,230 (1953) April 7.

Sulfur compounds are removed from olefinic naphthas by solvent extraction with 2,4-dimethylsulfolane.

D. M. Mason

Heinemann, H., Shalit, H. and Briggs, W. S. HOUDRIFORMING REACTIONS STUDIES WITH SULFUR COMPOUNDS. *Ind. Eng. Chem.*, 45, 800-806 (1953) April.

Houdriforming reaction involving the dehydrogenation of C_6 ring naphthenes, and isomerization and dehydrogenation of C_5 ring naphthenes were investigated in the presence of sulfur-containing compounds. The catalysts acted as desulfurization agents, converting the various sulfur compounds almost entirely to hydrogen sulfide. It was also found, that with sulfur concentration of 0.5% the dehydrogenation function of the catalyst was affected, resulting in a loss of activity. However concentration of the order of 0.2% sulfur shows no loss of activity. All tests were of 4 hrs. duration and it was possible to reverse the effect of the sulfur.

H. A. Dirksen

Exploration

Eckhardt, E. A. GEOPHYSICAL ACTIVITY SOARS TO NEW ALL-TIME PEAK IN 1952. *Oil Gas J.*, 51, 144, 5, 7, 8 (1953) March 30.

A report on the various methods of exploration used in 1952 in the search for oil, and the prospects and needs for the future of the geophysical exploration. The big problem is manpower.

B. E. Eakin

Fischer-Tropsch Synthesis

Arnold, J. H. and Grosselfinger, F. B. (assigned to Hydrocarbon Research Inc.) SYNTHESIS OF LIQUID HYDROCARBONS. U. S. 2,628,-970 (1953) February 17.

The patent claims that a high yield and long catalyst life can be realized by the regulation of the outlet concentration of hydrogen and carbon monoxide from the two-zone reactor (generator and synthetic zone). In accordance

with the present invention, the continuous charging of the resulting tail gas to both the generator and synthesis zone produces a minimum of catalyst disintegration, and an increase in liquid product yield. H. A. Dirksen

Gresham, W. F. (assigned to E. I. du Pont de Nemours and Co.) PROCESS FOR PREPARING HIGH MOLECULAR WEIGHT HYDROCARBONS. U. S. 2,632,014 (1953) March 17.

A process is claimed for preparing high molecular weight polymethylene hydrocarbons, of waxy paraffin type, by reacting at 200°C. and 200-600 atm. a $CO:H_2$ mixture of 2:1 ratio in the presence of ruthenium catalysts and water and an acidic reagent (phosphoric acid) while maintaining the pH below 2.
O. P. Brysch

Layng, E. T. (assigned to Hydrocarbon Research, Inc.) HYDROCARBON SYNTHESIS. U. S. 2,629,729 (1953) February 24.

The invention relates to the synthesis of liquid hydrocarbons in the gasoline boiling-range from $CO:H_2$ gas mixtures using a promoted iron catalyst. A mole ratio of more than 3:1 (H_2/CO) is preferred, with a CO_2 content of 15 mole %. Reaction products are removed from the reaction zone when the CO content is not lower than 1%, or preferably 2% to 3%. The high CO_2 content suppresses the formation of gaseous reaction products and of CO_2, thus converting the greater portion of CO to liquid hydrocarbons. W. G. Bair

Fuel Oil Demand

McIntosh, A. J. and Coble, J. A. FUEL OIL DEMAND — A LOOK AHEAD TO '55. *Nat. Petroleum News*, 45, 44-7 (1953) April 1.

Assuming continued business activity, fuel oil demand should continue to increase by somewhat below 7% annually as in recent years. Forecasts for consumption of distillate fuel oils, tabulated for the 5 fuel oil districts of the U.S., indicate that 1,605,000 bbl/day will be needed in 1955, an increase of 887,000 bbl/day over 1950. The great increase in gas sales from 1950 to 1955 is estimated to be equivalent to 1,300,000 bbl/day of oils. Tabulations on competitive residential fuels and weather effects are presented.
O. P. Brysch

Petroleum in England

PETROLEUM IN ENGLAND. *Petroleum*, 16, 100-03, 05 (1953) April.

A history of the development of oil production in England, which is at present about 55,000 tons annually. The drilling for oil has had many by-product results; two extensive new coal beds have been located and a large deposit of potash salts, and a present coal field has been extended. B. E. Eakin

Petroleum in Germany

Stahmer, A. M. INCREASING OIL ACTIVITIES IN GERMANY. *Petroleum Eng.*, 25, B7-B10, (1953) March.

Petroleum has been produced in Germany since 1870 in Hanover, and since 1930 in Schl. Holstein and Hamburg. Since 1944, discovery and continued drilling has been successful in Emsland, Hanover (Suderbruch) Middle Holstein, Weser-Ems and Upper Rhine (Wolfskehlen, Ech, Pechelbronn). Proved reserves are estimated at 210 million and probable at 95 million bbl. as of Jan. 1, 1952, and production of 20 million bbl/year may be surpassed.
O. P. Brysch

Petroleum in Turkey

Tasman, C. E. THE DOOR'S OPEN IN TURKEY. *World Oil*, 136, 233-5 (1953) March.

In the face of increased need for oil products and of the limitations of the government program, the Turkish government has liberalized its policy toward private oil interests. Although exploration and exploitation by foreign interests had not been forbidden, the earlier limitation of exploration area made prospects unattractive to either foreign or domestic companies. D. M. Mason

Production

Zaba, J. (assigned to McEvoy Co.) GAS LIFT SYSTEM AND APPARATUS THEREFOR. U. S. 2,633,086 (1953) March 31.

A gas lift system and apparatus mainly for intermittent "slug" type operation, but applicable to gas lifts generally. The bottom hole equipment can be placed without pulling the tubing, and the valves need no wire or macaroni-strings. A special valve mechanism is described. B. E. Eakin

Shale Retorting

Nicolai, L. A. and Molstedt, B. V. (assigned to Standard Oil Development Co.) FLUID-TYPE RETORTING OF OIL SHALE. U. S. 2,634,233 (1953) April 7.

A process utilizing an oil shale that normally disintegrates during distillation, the use of the solid distillation residue, and maintaining combustion temperature within a 1000°F.-1100°F. range are the chief points in this fluid-type retorting of shale. W. J. Pleticka

Sulfur from Sludge

Herndon, L. K. (assigned to Fluor Corp., Ltd.) SULFUR RECOVERY PROCESS. U. S. 2,631,087 (1953) March 10.

Recovery of sulfur from acid sludges is claimed, in which the sludge (refinery sludge, alkylation acid) is flowed onto an incandescent coke bed and decomposed into coke, and sulfur-bearing gases. The gases, freed of oil and breeze, are mixed with a hydrocarbon gas (natural gas), preheated, and passed through a second incandescent coke bed (1200-1600° F.) to reduce S compounds to sulfur, or passed further through one or more Al_2O_3 catalyst beds for complete conversion to sulfur which is condensed, or passed to a CS_2 furnace. O. P. Brysch

Transportation

USE OF TRUCK TANK VEHICLES BOOMS IN PAST 14 YEARS—RISES 648%. *Nat. Petroleum News*, 45, 41-42 (1953) April 29.

The volume of oil carried in domestic transportation in 1951 was more than double the amount moved in 1938 — an increase of 127% specifically. While all forms of transportation except railroads showed gains in volume during 1951 over 1938, tank truck movements during that 14-year period skyrocketed, showing a 648% increase in volume moved.

Excerpt

7. ANALYTICAL METHODS AND TESTS

CN and SCN Determination

Kruse, J. M. and Mellon, M. G. COLORIMETRIC DETERMINATION OF CYANIDE AND THIOCYANATE. *Anal. Chem.*, 25, 446-450 (1953) March.

An improved method is described for determining free and combined cyanide and thiocyanate in industrial wastes. The method includes recommendations for isolating the constituents for measurement and the use of a pyridine-pyrazolone reagent for cyanide and a copper-pyridine reagent for thiocyanate. Presented also are results of studies on color-forming reactions, interferences and attainable precision. Such tests on industrial wastes containing various metals were satisfactory. D. J. Dennison

Combustion Orsat

Robinson, M. L. PORTABLE COMBUSTION TUBE USED FOR ORSAT TYPE OF GAS-ANALYSIS APPARATUS. *Oil Gas J.*, 51, 346, 8, 51, 4 (1953) March 23.

The combustion tube consists of an electrically-heated platinum spiral in a small quartz tube. A single, three-minute pass of natural gas is sufficient for combustion of the sample, unless more than a couple percent of hydrocarbons heavier than ethane are present. Details of the construction and operation of the combustion tube are presented. C. E. Hummel

Nitrogen Bases

Deal, V. Z., Weiss, F. T. and White, T. T. DETERMINATION OF BASIC NITROGEN IN OILS. *Anal. Chem.*, 25, 426-432 (1953) March.

Two potentiometric titration methods are described for the determination and differentiation of organic bases in crudes, distillates, and residues. Total basic nitrogen can be determined by titration with perchloric acid in acetic acid-chlorobenzene solvent. Nitrogen compounds of moderately strong basicity such as piperidines or alkyl amines may be distinguished from this total by titration with hydrochloric acid in chlorobenzene solvent. Neither

method determines nitrogen compounds of the pyrrole, indole, carbazole, or diphenyl-amine type. The basicity of the petroleum distillates, residues, and crude oils tested indicated that 20 to 40% of the total nitrogen was present in the form of pyridine-quinoline-acridine types, whereas shale oils had from 50 to 70% of total nitrogen in this form. No bases as strong as piperidine were found in any oils.

Authors' Abstract

O_2 Determination

Cohn, J. G. (assigned to Baker & Co., Inc.) APPARATUS FOR THE CONTINUOUS ANALYSIS OF OXYGEN AND HYDROGEN. U. S. 2,631,925 (1953) March 17.

This patent deals with the Baker & Co., Inc. Deoxo Gas Indicator for measuring low concentrations (down to 0.01%) of H_2 or O_2. The rise in temperature associated with the reaction of H_2 with O_2 over a noble metal catalyst is measured. For determination of either component the other must be added, if not already present.

D. M. Mason

Polythionic Acids

Jay, R. R. DETERMINATION OF POLYTHIONIC ACIDS. *Anal. Chem.*, 25, 288-290 (1953) February.

An acidimetric method, based on the reaction of the polythionates with mercuric chloride gives check results with a deviation of less than 0.5% from the mean. The proposed method is rapid, accurate, and readily applicable to routine testing.

Author's Abstract

Ring Hydrocarbons

Martin, C. C. and Sankin, A. DETERMINATION OF AROMATIC AND NAPHTHENE RINGS IN AROMATICS FROM PETROLEUM FRACTIONS. *Anal. Chem.*, 25, 206-218 (1953) February.

A graph is presented in this paper for the calculation of average number of aromatic rings and number of naphthene (cycloparaffin) rings per molecule in aromatics concentrated from straight-run or cracked petroleum fractions. The required properties are density, specific dispersion, and molecular weight. Molecular weight may be derived from viscosities at 100° and 210°F., or from density and mid-boiling point. Average deviations of about 0.1 of an aromatic ring and about 0.2 of a naphthene ring are shown for aromatics from a number of petroleum fractions and for individual aromatics with benzene, naphthalene, or phenanthrene nuclei. Compounds which interfere with the analysis are generally absent or are present in minor amounts in aromatic concentrates from petroleum. The new method is more rapid than any previous method of comparable accuracy that has been used for determining the average composition of high-boiling aromatics from petroleum.

Authors' Abstract

Sulfur Determination

Kusa, H. J. (assigned to Standard Oil Co.) ANALYTICAL APPARATUS FOR DETERMINATION OF SULFUR. U. S. 2,634,360 (1953) April 7.

With the quartz tube method for determination of sulfur in organic compounds the sample is pyrolyzed by an electrical heater which is automatically controlled for smooth and progressive heating without attention from the operator.

D. M. Mason

Streuli, C. A., Scheraga, H. A., and Nichols, M. L. X-RAY INVESTIGATION OF SEVERAL CONTAMINATED BARIUM SULFATE PRECIPITATES. *Anal. Chem.*, 25, 306-310 (1953) February.

Variations in the unit cell volume of barium sulfate in precipitates having same diffraction patterns are attributed to coprecipitated ferric, nitrite, or chloride ions entering into solid solution with barium sulfate.

C. E. Hummel

Vapor Pressure Method

Oliver, G. D. and Grisard, J. W. METAL EBULLIOMETERS FOR VAPOR PRESSURE MEASUREMENT. *Rev. Sci. Instruments*, 24, 204-206 (1953) March.

Apparatus and methods are described for the measurement of the vapor pressure of materials, especially corrosive liquids, over the entire liquid range.

D. M. Mason

8. GENERAL AND PHYSICAL CHEMISTRY

Adsorption

Beebe, R. A., Millard, B. and Cynarski, J. HEATS OF ADSORPTION OF NITROGEN AND ARGON ON POROUS AND ON NON-POROUS CARBON ADSORBENTS AT -195°. *J. Am. Chem. Soc.*, 75, 839-845(1953) February 20.

By means of an isothermal calorimeter, heats of adsorption at -195° have been determined for nitrogen and argon on Spheron and Graphon carbon blacks, on two samples of Saran charcoal previously studied by Pierce, et al., and on carbon wear-dust prepared by Savage. In the course of these measurements we have found that certain anomalies both in the isotherm and the heat-coverage curve, observed by Joyner and Emmett for the system nitrogen-Graphon, are likewise present in the results for the system argon-Graphon. The magnitude of the heats obtained with the porous Saran charcoals is discussed in relation to pore diameters. The heat data indicate that the carbon wear-dust does not present as homogeneous a surface as might have been predicted.

Authors' Abstract

Carbon Disulfide

Grossman, P. R. (assigned to The Babcock & Wilcox Co.) PROCESS AND APPARATUS FOR THE THERMAL SYNTHESIS OF CARBON COMPOUNDS. U. S. 2,630,373 (1953) March 3.

A method of synthesizing carbon disulfide is described wherein the carbon is obtained by deposition of a thermally cracked hydrocarbon upon an inert heat-transfer medium, which is transported into a reaction zone containing vaporized sulfur. The spent heat-transfer medium is passed through a heat exchanger to bring it back to its initial temperature, and is recycled again. S. Mori

Wimberly, J. J. (assigned to The New Jersey Zinc Company) PRODUCING CARBON DISULFIDE. U. S. 2,633,409 (1953) March 31.

Sulfur dioxide, pure or dilute as in roaster gas, when passed downward and concurrently with a moving bed of active carbon being progressively heated to a maximum temperature of 1300° C. and then cooled, is claimed to give improved reaction efficiency and capacity of carbon disulfide production over a counter-current flow method. O. P. Brysch

Combustion Thermodynamics

Edwards, H. E., Smith, R. W., Jr. and Brinkley, S. R., Jr. THE THERMODYNAMICS OF COMBUSTION GASES: TEMPERATURES AND COMPOSITION OF THE COMBUSTION PRODUCTS OF OXYACETYLENE FLAMES. *U. S. Bur. Mines Rept. Invest.* 4958 (1953) March.

The equilibrium composition and the thermodynamic properties of the combustion products of acetylene with oxygen is tabulated between temperatures of 1800 to 3,600 °K at atmospheric pressures, and at various fuel-to-oxygen ratios. S. Mori

Condensation Mechanism

Wylie, R. G. THE CONDENSATION OF A VAPOUR AT A CRYSTALLINE SURFACE. *Australian J. Sci. Res.*, 5, 628-646 (1952) December.

A theory of the condensation of vapor on a solid surface is developed, particularly for a case in which non-wetting liquid is formed. The kinetic theory for a more realistic model of a crystal surface is given. The theory shows that the supersaturation for which nucleation proceeds at a just observable rate on a plane surface increases rapidly as the contact angle increases from zero. Unless an edge free energy is introduced, no supersaturation is necessary for nucleation at a line or corner of intersection of plane surfaces when the contact angle is less than a threshold value which depends on the angles between the planes. As the contact angle increases above the threshold value the supersaturation required for observable condensation increases considerably. D. C. Gami

CO_2-H_2S Equilibria

Bierlein, J. A. and Kay, W. B. PHASE-EQUILIBRIUM PROPERTIES OF SYSTEM CARBON DIOXIDE-HYDROGEN SULFIDE. *Ind. Eng. Chem.*, 45, 618-624 (1953) March.

Pressure-volume-temperature behavior of the saturated states of eight mixtures of hydrogen

sulfide-carbon dioxide at temperatures between ice point and cricondentherm is investigated.

D. C. Gami

Ethane-H_2S Equilibria

Kay, W. B. and Brice, D. B. LIQUID-VAPOR EQUILIBRIUM RELATIONS IN ETHANE-HYDROGEN SULFIDE SYSTEM. *Ind. Eng. Chem.*, 45, 615-618 (1953) March.

P-V-T-x relations at the liquid-vapor boundaries of ethane-hydrogen sulfide system are presented. This system forms an azeotrope, the composition of which varies with the pressure and temperature. Six mixtures have been studied. D. C. Gami

Liquid Hydrogen

Grilly, E. R. THE LIQUEFACTION AND STORAGE OF PARTIALLY CONVERTED LIQUID HYDROGEN. *Rev. Sci. Instruments*, 24, 16-19 (1953) January.

Loss of liquid hydrogen during storage can be reduced considerably if the hydrogen contains a lower percentage of ortho form than in the normal condition (75% ortho and 25% para). A catalytic conversion which produces 50% ortho when cooled with liquid air is described.

D. C. Gami

Methane Kinetics

Markham, M. C., Wall, M. C. and Laidler, K. J. MOLECULAR KINETICS AND MECHANISM OF METHANE-DEUTERIUM EXCHANGE REACTIONS ON NICKEL. *J. Phys. Chem.* 57, 321-323 (1953) March.

The data of Kemball on the methane-deuterium exchange on evaporated nickel are discussed, mechanisms are formulated, and absolute rate equations derived. CH_3D is considered to be formed from adsorbed CH_3 and D, and the rate of production of CH_3D is shown to be approximately equal to the rate of adsorption of methane as methyl radicals. CH_2D_2, CHD_3 and CD_4 are considered to be formed by reaction between adsorbed methylene radicals and adsorbed deuterium atoms, and a treatment is given for the relevant statistical factors. Calculated rates for all four processes are in excellent agreement with the experimental ones.

Authors' Abstract

Nitrogen-Ethylene Data

Hagenbach, W. P. and Comings, E. W. PVT RELATIONS OF NITROGEN AND ETHYLENE MIXTURES AT HIGH PRESSURE. *Ind. Eng. Chem.*, 45, 606-609 (1953) March.

Compressibility factors of four mixtures of nitrogen and ethylene at 50° C. and pressure up to 600 atmospheres are given. D. C. Gami

Nitrogen Properties

Granet, I. and Kass, P. VISCOSITY, THERMAL CONDUCTIVITY AND SPECIFIC HEAT OF NITROGEN AT ELEVATED PRESSURES AND TEMPERATURES. *Petroleum Refiner*, 32, 149-150 (1953) March.

This is a condensed review of the high temperature, high pressure properties of nitrogen as reported in the literature. Correlation of the properties is discussed and 22 references are cited. W. W. Clauson

Pyridine Properties

Herington, E. F. and Martin, J. F. VAPOR PRESSURES OF PYRIDINE AND ITS HOMOLOGS. *Trans. Faraday Soc.*, 49, 154-162 (1953) February.

The vapor pressures of very pure samples of pyridine, alpha-, beta- and gamma-picoline, 2:5- and 2:6- lutidine have been measured over the temperature range from 50°C to the normal boiling point. The results for the normal boiling points are accurate to ±0.003°C and the vapor pressures over the temperature range studied have been fitted to equations of the Antoine type. Authors' Abstract

Sulfur Properties

Rice, F. O. and Sparrow, C. PURPLE SULFUR, A NEW ALLOTROPIC FORM. *J. Am. Chem. Soc.*, 75, 848-850 (1953) February 20.

According to vapor pressure measurements, sulfur vapor in the pressure range 0.1-1.0 mm. and the temperature range 500-700° consists almost entirely of S_2 molecules. It has been found that these may be frozen out on a liquid-nitrogen-cooled surface to give a purple solid. On warming to room temperature, this changes in the course of a few seconds, to a mixture con-

taining about 40% of crystalline sulfur and 60% of amorphous sulfur. The activation energy of the change is 3.1 kcal.

Authors' Abstract

Viscosimetry of Gases

VISCOSIMETRY OF GASES AT HIGH TEMPERATURES AND PRESSURES. *Nat. Bur. of Stand. Techn. News Bull.*, 37, 49-52 (1953) April.

A program of research on the viscosity of pure gases and gas mixtures was undertaken by the National Bureau of Standards. The gases are nitrogen, carbon, dioxide, argon, oxygen, carbon monoxide and water. The pressure and temperature range is 5 to 10,000 psi and 60 to 2,500°F. Inconel capillary tubes are used, (0.038 cm. average internal bore, lengths up to 434 cm.). At high temperatures the capillary is coiled. A special flowmeter was designed to measure and control the low flow rate through the capillary.

W. W. Clauson

9. ORGANIC CHEMISTRY

Acetylene Production

Ediger, W. (assigned to Technical Assets Inc.) PROCESS FOR THE PRODUCTION OF ACETYLENE FROM LIQUID HYDROCARBONS. U. S. 2,632,731 (1953) March 24.

An intermittant electric arc discharge process for the production of acetylene from liquid hydrocarbons is described which is claimed to have higher arc efficiency (large arc area) and less product decomposition than heretofore. Up to 50 volume percent acetylene in the gaseous products and 24 weight percent of the feed were recovered by dispersing carbon granules (electrodes) in a thin layer on a tray submerged in the hydrocarbon liquid.

J. M. Reid

Sachsse, H., Kosbahn, T. and Lehrer, E. PRODUCTION OF ACETYLENE BY INCOMPLETE COMBUSTION OF HYDROCARBONS. U. S. 2,630,461 (1953) March 3.

A new method is claimed for controlling the pressure of oxygen and hydrocarbon gas streams to prevent burner flashbacks in the partial combustion acetylene process.

J. M. Reid

Aromatics

Cady, W. E., Launer, P. J. and Weitkamp, A. W. AROMATIC HYDROCARBONS. *Ind. Eng. Chem.*, 45, 350-3 (1953) February.

In the products of hydrogenation of carbon monoxide over iron catalysts, the concentrations of aromatic hydrocarbons in successive carbon-number fractions increase almost linearly with carbon number in the 6- to 14-carbon range, which was studied by silica-gel adsorption and distillation separations, and by ultraviolet and infrared techniques. Paraffins show a similar but lesser increase, which suggests that aromatics and paraffins are formed at the expense of olefins. Distributions of the C_8 and C_9 isomers (and higher) differ widely from thermodynamic equilibria. A scheme for predicting these distributions is outlined.

O. P. Brysch

Thornton, D. P., Jr. FIRST COMPLETE UDEX 'B-T-X' PLANT MAKES NITRATION-GRADE PRODUCTS. *Petroleum Processing*, 8, 384-387 (1953) March.

A description along with a flow diagram of the Platforming and Udex separation operation of the Cosden Petroleum Corp. is given in non-technical detail.

W. J. Pleticka

Isomerization

Pfennig, R. F. (assigned to Standard Oil Development Co.) PRODUCTION OF PARAXYLENE. U. S. 2,632,779 (1953) March 24.

Paraxylene is produced in substantial quantities by passing a C_8 feedstock high in metaxylene together with hydrogen over a catalyst selected from oxides and sulfides of group VI, at temperatures of 800-1150° F., pressures of 50-500 psig and space velocities of 1-5, and recovered by fractional distillation, refrigerated crystallization and filtration.

O. P. Brysch

Oxidation Reactions

Burgoyne, J. H. and Cox, R. A. THE OXIDATION OF ETHYLENE AND PROPYLENE IN THE GAS PHASE. *J. Chem. Soc.* (British) 876-883 (1953) March.

The products formed from the reaction of propylene with air have been examined and the variation of the reaction with temperature and different fuel-air mixtures is reported.

A. R. Khan

Gray, J. A. OXIDATION OF ETHANE, AND COOL FLAMES. *J. Chem. Soc.* (British) 741-750 (1953) March.

A study of rich ethane-oxygen mixtures at temperatures above 400° and atmospheric pressure provides a reaction mechanism which explains the cool-flame periodicity. A. R. Khan

Petrochemical Expansion

Boyd, J. H. and Rackus, C. A. PETROCHEMICALS EXPANDING 14 PER CENT ANNUALLY. *Petroleum Eng.*, 25, C3-C5 (1953) April.

A review of the rapid growth of the petrochemical industry during recent years. Outline of the trends most evident in the industry and some predictions of future growth.

G. V. Vosseller

Phenol Ozonation

Niegowski, S. J. DESTRUCTION OF PHENOLS BY OXIDATION WITH OZONE. *Ind. Eng. Chem.*, 45, 632-634 (1953) March.

The contamination of drinking water, due to industrial and commercial wastes, gives rise to a problem of considerable importance. The products of ozonation of phenolic compounds have little or no objectionable odors or tastes, nor do they produce any after chlorination. The ozonation procedure employed in the laboratory is described. The amounts of ozone required, the effects of pH and sulfides, as well as thiocyanate oxidation, reduction of chemical oxygen demand, and color are discussed. R. Parker

Phenol Production

Adams, J. F., Bauer, R. L. and Taylor, G. E. (assigned to Monsanto Chemical Co.) METHOD FOR FUSION REACTIONS, ESPECIALLY INCLUDING PRODUCTION OF PHENOLS. U. S. 2,632,028 (1953) March 17.

A method for producing phenol by benzene sulfonate fusion is claimed, in which a fluid melt of sodium phenate and sodium sulfite in ratio of 6 to 1 is maintained in circulation from an upper disengaging zone down through a tubular preheating zone and returned upward through a feed and reaction zone at 350 to 420° C. Sodium benzene sulfonate and caustic soda solutions, added through an injection nozzle at the base of the reaction zone, are decomposed to form phenol, steam and sodium sulfite. Phenol and steam from the upper zone are passed continuously to fractionating apparatus and sodium sulfite also is removed as crystal slurry from a side-stream of melt dissolved in water.

O. P. Brysch

Aller, B. V., Hall, R. H., Quin, D. C., and Turck, K. H. (assigned to Hercules Powder Co.) MANUFACTURE OF PHENOLS. U. S. 2,628,983 and 2,628,984 (1953) February 17.

A benzene homolog (isopropyl benzene) is oxidized in the liquid phase by molecular oxygen until 10 to 50% is converted to peroxy-compounds, then the mixture is heated with an aqueous acid (10% H_2SO_4) in a pressure-agitator until the per-compounds are decomposed and converted into phenols and ketones (acetone). The acetone is removed as vapor and the acid-oil product is decanted to separate the oil layer which is distilled to recover the phenol and the unreacted alkyl benzene. The second patent relates to variations in per-compound treatment and recovery of products. O. P. Brysch

Cumming, A. P. SEPARATION OF PHENOLS FROM COAL-TAR HYDROCARBONS BY MEANS OF GLYCEROL AND AQUEOUS TRIETHYLENE GLYCOL: DEVELOPMENT OF A PROCESS. *J. Appl. Chem.*, (British) 3, 98-104 (1953) March.

The present paper is an extension of the work on the extraction of phenol from coal-tar hydrocarbons, and deals with the separation of mixed phenols from coal-tar hydrocarbons boiling in the range 170°-201°. By subsequent treatment of the extract, a final mixed-phenols product can be produced containing 0.1% of hydrocarbons or less. The outlines of a process for this separation are included. Author's Abstract

Phthalic Acids Production

Sherwood, P. W. PHTHALIC ACIDS—PETROCHEMICALS OF THE FUTURE. PART I. ECONOMIC IMPORTANCE AND THE REACTION VARIABLES. *Petroleum Refiner*, 32, 113-7 (1953) March.

The uses of phthalic acid as such are quite limited, but the anhydride is a valuable raw ma-

terial in the production of alkyd resins and plasticizers for vinyl and nitrocellulose resins. Terephthalic acid is used by the textile industries in production of "Dacron and Terylene". A discussion of the production of phthalic anhydride from naphthalene and ortho-xylene is presented. The effects of the catalyst, temperature of reaction, air/hydrocarbon ratio, and space velocity in this production are thoroughly discussed. R. Parker

Sherwood, P. W. PHTHALIC ACID — PETROCHEMICALS OF THE FUTURE. PART II. COMMERCIAL OPERATIONS. *Petroleum Refiner*, 32, 155-158 (1953) April.

The various methods of oxidizing orthoxylene or naphthalene to phthalic acids are described in partial detail. W. J. Pleticka

Traced Hydrogenation

Bond, G. C. and Turkevich, J. THE REACTION OF PROPYLENE WITH DEUTERIUM OVER A PLATINUM CATALYST. *Trans.* Faraday Soc. (British), 49, 281-291 (1953) March.

The reaction between propylene and deuterium has been studied in the temperature range -18°C to 130°C over a pumice-supported catalyst, and the products have been analyzed by mass spectrometer. H. A. Dirksen

Urea Synthesis

White, D. H. (assigned to Phillips Petroleum Co.) UREA SYNTHESIS. U. S. 2,632,771 (1953) March 24.

This method for synthesis of urea from ammonia and carbon dioxide claims the improvement of reaction at high pressures and at 300-400° F. and crystallization of urea at lower temperatures (120°F.) in the same vessel. The crystal slurry is withdrawn to a lower zone, depressurized, the urea recovered by filtration and the mother liquor recycled to the reactor. O. P. Brysch

The following articles, the abstracts for which appear on the pages indicated, are also called to your attention:

Deal, V. Z. BASIC NITROGEN IN OILS. p. 107

Herington, E. F. VAPOR PRESSURES OF PYRIDINE AND HOMOLOGS. p. 110

10. CHEMICAL ENGINEERING

Catalytic Conversion

Leffer, F. W. (assigned to Universal Oil Products Co.) METHOD AND APPARATUS FOR EFFECTING THE CATALYTIC CONVERSION OF AN ORGANIC REACTANT STREAM, PARTICULARLY A LIQUID CHARGE. U. S. 2,629,684 (1953) February 24.

A process for catalytic conversion of organic reactants utilizing a downward-moving concurrent flow of reactant stream and subdivided solid catalyst and a counter-current flow between the used catalyst and regenerating medium is claimed. C. E. Pierson

Dust Removal

McBride, C. B. and Best, P. F. (assigned to The Thermix Corp.) APPARATUS FOR SEPARATING SUSPENDED PARTICLES FROM GASES. U. S. 2,632,527 (1953) March 24.

An apparatus for removing suspended particles from a gas and consisting of a number of centrifugal tubes is described. E. J. Pyrcioch

Flow Theory

Bruce, G. H., Peaceman, D. W., Rachford, H. H., Jr. and Rice, J. D. CALCULATIONS OF UNSTEADY-STATE GAS FLOW THROUGH POROUS MEDIA. *J. Petroleum Techn.*, 5, 79-92 (1953) March.

The problem of unsteady-state gas flow through porous media leads to a second-order non-linear partial differential equation for which no analytcal solution has been found. In this paper, an electronic digital computor is used to perform the numerical integration using an implicit form of an approximating difference equation. The solutions are compared with laboratory studies. A very important aspect of this paper is the solution of the non-linear partial

differential equation by an approximation equation applicable to an electronic computer, as these equations appear frequently in reservoir calculations. B. E. Eakin

Fluidization

Cyr, H. M., Siller, C. W., and Steele, T. F. (assigned to The New Jersey Zinc Co.) PROCESS FOR FLUID BED OPERATION. U. S. 2,621,-118 (1952) December 9.

The patent claims to produce greater efficiency and turbulence in a fluid reactor by introducing the fluidizing gas at several points along the depth of the fluid bed. This divides the fluid bed into different zones of turbulence, with turbulence increasing and bed density decreasing as the bed depth decreases. W. G. Bair

Gunness, R. C. FLUIDIZED-SOLIDS TECHNIQUE IN THE PETROLEUM INDUSTRY. *Chem. Eng. Progress*, **49**, 113-6 (1953) March.

A comprehensive discussion of fluidized-solids techniques and applications in the petroleum industry is presented. In contacting gases with solid reactants or catalysts, use of a fluidized bed of solid particles leads to uniform temperatures, high reaction rates, and increased yields. How these advantages are utilized in catalytic cracking, hydroforming, hydrocarbon synthesis, and extraction of shale oil is described in detail with accompanying simplified flow diagrams. J. M. Reid

Gas Cleaning

Stephens, F. M. and Fluor, J. R. (assigned to The Fluor Corp., Ltd.) GAS SEPARATOR. U. S. 2,632,523 (1953) March 24.

A vertical separator is claimed for removing solids and liquids entrained in the gas by passing the gas thru a venturi in a solids-trapping liquid bath, followed by baffles to remove the liquid from the gas. B. E. Eakin

Heater Practise

Born, H. J. and Rose, G. E. DIRECT-FIRED HEATERS IN NATURAL-GASOLINE PLANTS. *Oil Gas J.*, **51**, 101-4 (1953) March 9.

The increasing use of direct-fired tube heaters in natural gasoline production is discussed. Particular emphasis is placed on selection of design features to obtain maximum overall economy gained through decreased fuel costs and maintenance. J. M. Reid

Heat Exchanger

Gilmour, C. H. SHORTCUT TO HEAT EXCHANGER DESIGN. *Chem. Eng.*, **59**, 144-45, 48 (1952) October; **60**, 226-29 (1953) March; **60**, 214-22 (1953) April.

The series of articles deals with nomographic solutions to heat exchanger design problems. The first article in this series develops a basic method for the design of heat exchangers. Use of the method for conditions of no phase change, forced convection, turbulent flow, and cross flow in shell was described. Article II describes the use of the basic method for conditions of no phase change, forced convection, turbulent flow, and parallel flow in shell. The last article gives the method for an exchanger operating on a condensable vapor with very small amounts of non-condensibles present. W. G. Bair

Pebble Heater

Buehl, R. C., Morris, J. P. and Riott, J. P. PEBBLE STOVES FOR HEATING GASES TO HIGH TEMPERATURES. U. S. Bur. Mines Rep. Invest. 4949 (1953) March.

Results obtained from a system of two parallel Royster pebble stoves operating alternately, with one heated while the other is cooled, indicated that this technique is feasible in superheating air to temperatures up to 2600°F. The system consisted of a mullite brick-lined and insulated combustion space containing a fixed bed of high grade alumina spheres, with alternate heating of the pebbles obtained by downward firing of natural gas-air mixtures. Air to be heated is passed upwardly through the preheated pebbles. C. von Fredersdorff

Piping Design

Wilbur, W. E. . . . THERMAL STRESSES IN PIPING SYSTEMS. PART I. *Petroleum Refiner*, **32**, 143-148 (1953) March.

The first of a three-part article dealing with calculation of stresses caused by temperature changes in pipe systems. An approximate method is presented for locating a thrust line of a given pipe assembly. From this thrust line, the

moments at various fittings, valves and joints can be calculated to give an idea of the stress developed at these vital points. Possible errors of 10-15% could be obtained. References are given to more detailed analyses of the problem. W. G. Bair

11. PROCESS EQUIPMENT AND INSTRUMENTATION

Calorific Value Control

Mortimer, K. R. AUTOMATIC CALORIFIC VALUE CONTROL. *Gas J.* (British) **273**, 694-695 (1953) March 25.

Description of steps taken in converting a lamp indicating system on a vertical retort battery to an electronic system for regulating dilution of retort gas with producer gas. Previously the lamp system required manual regulation and consequent wide variation in calorific value of output gas. The new system utilizes impulses from the light indicating system to position a motorized butterfly valve in the producer-gas supply line. With an accepted variation of 5 Btu/SCF, the distance/velocity lag causes a variation of 20 Btu/SCF but along a typical sine wave. Dampening effect of the gas handling system causes calorific value vs. flow curve to flatten out before gas is sent to distribution system. R. A. Bambenek

Gaging

Aller, W. F. THEORY OF GAGING: A REVIEW OF MECHANICAL, ELECTRICAL, AND PNEUMATIC SYSTEMS. *Mech, Eng.*, **75**, 199-204 (1953) March.

A general discussion of mechanical devices for measuring linear distances. Air gaging has been developed in recent years to a very accurate and reliable degree, and can be used to augment the other methods. W. G. Bair

Holiday Detector

Leto, A. and Gally, S. K. SO-CAL ENGINEERS IMPROVE PEARSON HOLIDAY DETECTOR. *Gas*, **29**, 61, 62, 64 (1953) March.

A new model holiday detector is described. With the improvements it is claimed the operator can search for holidays from five to six miles from the transmitter. An improved receiver is described which weighs 1.1 lb. and is free from interference and much easier for the operator to handle. C. E. Pierson

Hot-Wire Gage

Reynolds, F. H. AN ELECTRICAL MANOMETER FOR GAS PRESSURES UP TO 40 MM. HG. *J. Sci. Instruments* (British), **30**, 92-96 (1953) March.

The range of the hot-wire gage is extended for neon and argon up to pressures of 40 mm of mercury. The gage is direct-reading and, by the use of rectifiers arranged to compensate for the inherent non-linearity of the gage, a fairly linear calibration is obtained.

Author's Abstract

Pyrometry

Thurlow, G. G. MEASUREMENT OF SURFACE TEMPERATURE. *Brit. Coal Utilitis. Res. Assoc.*, **17**, 1-10 (1953) January.

Two main difficulties involved in high surface temperature measurements have been discussed; — the difficulty in adjusting the instrument when the surface and its surroundings are hot, and the formation of a coating due to oxidation or other deposits. The methods for making the measurements are reviewed according to three categories: (1) Radiation methods, (2) thermocouples, and (3) other direct or indirect methods. Radiation equations have been derived by assuming both the surface and the surrounding gas to be grey bodies. A table summarizing the normal total emissivity of various surfaces is given. Good thermocouple readings are said to be obtainable only when precautions are taken to (1) secure good thermal contact between the thermocouple and the surface; (2) minimize the heat transfer along the wires to the junction; and (3) keep the thermal and aerodynamic conditions at the point of measurement from being unduly disturbed. S. Hu

Refinery Cleaning

Farrar, G. L. CHEMICAL CLEANING OF REFINING EQUIPMENT. *Oil Gas J.*, **51**, 211, 12, 15, 19, 23, 24, 26, 30, 32, 35 (1953) March 23.

For best results chemical cleaning should be a matter of regular routine. Removal of surface

scale, deposits, and impurities from metals by acid or other solvent is commercially feasible. When chemical cleaning is applicable, it is efficient, time saving, and economical. Outage time is reduced, major dismantling of equipment is eliminated, labor and equipment are kept to a minimum and the metal loss is inconsequential. Data from various cleaning jobs are included. B. E. Eakin

12. MATERIALS OF CONSTRUCTION

Coatings

Farris, R. W. THE ROLE OF FIBROUS GLASS MATS IN PIPELINE CORROSION CONTROL. *Gas* **29**, 104, 06, 08, 10 (1953) March.

The theory and supporting test procedures which have made possible the development of fibrous glass mats are discussed. Advantages of this type reinforcement for enamels are also described. C. E. Pierson

High-Pressure Testing

Texter, H. G. VARIOUS METHODS OF HIGH PRESSURE TESTING OIL COUNTRY TUBULAR MATERIAL. *Petroleum Eng.*, **25**, B45-54 (1953) March.

The forces tending to collapse or burst tubing and casing increase as wells are drilled deeper. The API internal pressure test based on 80% of the minimum yield strength is presented. To date only field testing is available for pressures to 10000 psi. Various methods of high-pressure testing in the well are outlined and their advantages and disadvantages explained. B. E. Eakin

Pipeline Corrosion

Farrar, G. L. MITIGATION OF PIPELINE CORROSION. *Oil Gas J.*, **51**, 148, 150, 153 (1953) April 20.

A compiled report of technical papers, discussions, and symposiums covering the current trend in designs of cable systems for cathodic protection of pipe-lines. Emphasis is placed on economic consideration. B. E. Eakin

Plastic Pipe

O'Keefe, P. SEVEN KINDS OF PLASTIC PIPE. . . . THEIR PROPERTIES AND USES. *Materials and Methods*, **37**, 103-7 (1953) March.

The properties and uses of polyethylene, modified polystyrene, cellulose acetate butyrate, saran,rigid polyvinyl chloride, polyester, and thermosetting laminate pipes are described. W. J. Pleticka

Wear-Resistant Metals

Elonka, S. HARD SURFACING. *Power*, **97**, 106-122 (1953) March.

A general presentation of the need and various methods of hard surfacing is given. W. J. Pleticka

Wrought Ni-Cr Alloy

Goetcheous, P. ENGINEERING DATA ON WROUGHT 35 Ni—15 Cr ALLOY. *Ind. Heating*, **20**, 454-466 (1953) March.

This alloy is recommended for use in the high temperature range of 1400-2100°F. because of its superior chemical resistance under various adverse conditions. Tables are given showing its chemical composition, and mechanical properties at both room temperature and high temperatures. Fabrication details are given under the following headings: heat treatment, welding, cutting and machining, forming, forging, and uses. S. Hu

Well Corrosion

Farrar, G. L. COMBATING CORROSION IN OIL AND GAS WELLS. *Oil Gas J.*, **51**, 106-8 (1953) April 13.

Approximately 30 per cent of the country's low-pressure sweet-oil wells are economically affected by water-dependent corrosion, average cost being $960 per well. Most widely practiced mitigation is by means of chemical inhibitors. Most failures in oil-well casing are due to corrosion. Several methods are effective for mitigation. Organic inhibitors are used most often to control corrosion in condensate wells. Author's Abstract

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Bibliography of Technical Reports
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